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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/529,945

12/05/2005

Hendrikus Koenraad Albertus Meijer

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Novak Druce + Quigg, LLP  
1300 Eye Street, NW, Suite 1000  
Suite 1000, West Tower  
Washington, DC 20005

EXAMINER

PO, MING CHEUNG

ART UNIT

PAPER NUMBER

1797

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/529,945	<b>Applicant(s)</b> MEIJER ET AL.	
	<b>Examiner</b> MING CHEUNG PO	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04/01/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/01/2005</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Office Action Summary*

1. This is the initial office action in response to application 10/529,945 filed on 12/05/2005.
2. Claims 1 – 35 are pending and have been fully considered.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4, 9, 11, 13-19, 22, 23, 25, 26 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over WOLFE (U.S. 5,151,159).
5. WOLFE teaches in lines 64 – 68 of column 2 and lines 1-2 of column 3, a coal pyrolyzer that includes a retort chamber into which coal particles are fed. The coal pyrolyzer includes a retort chamber (**housing**) with a pair of interfolded screw conveyors (**intermeshing double extrusion screws**) rotably connected therein to convey coal there through at the selected rate. The screws rotate in opposite directions (**counter rotating**) with such rotation being intermittently reversed to prolong the residence time of the coal within the retort chamber.

WOLFE does not seem to explicitly state that the intermeshing double extrusion screw have blades such that the thickness of a blade is at least half the distance between two neighboring blades.

However, WOLFE does provide in figure 1, a drawing that shows the blades on each shaft have thickness that are at least half the distance between the two neighboring blades.

WOLFE also does not seem to explicitly state that the two screws fit closely in the housing such that the material undergoing the treatment has to stay between the blades if the screws.

However, once again, WOLFE does provide in figure 1 the two shafts fit closely in the housing such that the material undergoing the treatment has to stay between the blades if the shafts.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 4, WOLFE seem to explicitly state that the screw has a double blade over at least part of its length.

However, WOLFE does teach in lines 66 – 68 of column 4 that each drive screw has a flight (**blade**) connected in spiraling relation.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a double blade, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis paper Co. v. Bemis Co.*, 193 USPQ 8.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 9, WOLFE teaches in lines 19 – 32 of column 5 that volatile

hydrocarbon gases that are release form pyrolyzing leaves to a condenser.

Regarding claim 11, WOLFE does not seem to explicitly state that the distance between the shaft of the screw and the housing is at least of the same order as the distance between two successive blades.

However, in the figure 4, WOLFE clearly shows that the distance between the shaft of the screw and the housing is at least of the same order as the distance between two successive blades.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 13, WOLFE shows clearly in figure 4 that the screw extruders behind two walls.

Regarding claims 14 and 29, WOLFE does not seem to explicitly state that the housing and/or the extrusion screw have been made from cast iron.

However, it is well known in the art to use cast iron or more specifically, nodular cast iron to create a pyrolyzing retort chamber.

Therefore, it would have been a matter of design choice to use nodular cast iron to create the housing and the extrusion screw.

The invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claims 15, 30, and 31, WOLFE does not seem to explicitly state that the housing has a net length between 1 and 25 meters, between 8 and 15 meters and approximately 12 meters.

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However, WOLFE also does not teach that the housing may not have a net length between 1 and 25 meters, between 8 and 15 meters and approximately 12 meters.

The applicant does not provide a reason why the net length of the housing is important.

Therefore, it would have been a matter of design choice to create the housing with a length between 1 and 25 meters, between 8 and 15 meters and approximately 12 meters.

The invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 16, WOLFE teaches in lines 43 - 46 of column 2 that the apparatus taught is for continuously converting coal into motor usable liquid fuels and high grade metallurgical coke. In lines 45 - 48 of column 3, WOLFE teaches that char is produced after the volatile hydrocarbon gases and water vapor have been removed. The char is used to create the coke.

Regarding claim 17, WOLFE teaches in lines 36 – 45 of column 1 that the problem with conveying apparatus is that coal assumes a plastic consistency (**reaction phase in which the material may become at least partially plastic**) during the pyrolyzation stage (**pyrolytical conditions**) and clings to the conveyor or screw . The temperature in the retort chamber is taught in lines 2-4 of column 3 to be maintained at 800 F or more (**heating phase**). The products are taught in lines 33 - 44 and are separated. The screws are taught in lines 67 – 68 of column 2 and lines 1-2 of column

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3 to rotate intermittently reversed to prolong the residence time of the coal in the retort chamber **(third phase in which one or more processed products are formed wherein the processed products are formed in the housing while the material and the products are transported by means of the counter rotating intermeshing double extrusion screw).**

Regarding claim 18, WOLFE teaches in lines 10 – 16 of column 3 that a lost motion clutch is connected to one of the screws to periodically bring the screw's spiral flights in contact to scrape away any coal residue adhering thereto **(extrusion screw is self-cleaning during the transport of the material and the processed products).**

Regarding claim 19, the coal is inherently kneaded by the flight of the drive shaft **(processed products are kneaded during transport).**

Regarding claim 22, WOLFE teaches in lines 6 - 8 of column 3 that the residence time of the coal in the coal pyrolyzer is approximately twenty minutes **(transporting time of the material and the processed products in the housing is between 10 and 60 minutes).**

Regarding claim 23, WOLFE does not seem to explicitly teach the pressure at which the material and the processed products are treated under.

It is assumed that the material and processed products are treated under atmospheric pressure which is approximately 1.01325 bar **(between 0.5 and 5 bar).**

Regarding claim 25, WOLFE teaches in lines 41 - 44 of column 3 that the condensable coal liquids **(tar)** are separated into volatile hydrocarbon motor fuels and motor fuel supplements.

Regarding claim 26, WOLFE does not seem to explicitly teach that the material is biomass, tires, or waste and the treatment is making oil and gas.

However, it is well known that biomass may be made into oil or gas with the addition of heat and other catalysts.

One of ordinary skill in the art would, with a reasonable expectation of success, expect the same result if the biomass is placed in the retort chamber that WOLFE teaches.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

6. Claims 20 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over WOLFE (U.S. 5,151,159) in view of COX (U.S. 3,471,369).

The above discussion of WOLFE is incorporated herein by reference.

WOLFE does not seem to explicitly state that velocity that the screw rotates per minute.

However, COX teaches in lines 4 - 15 of column 2 a system for creating char from trash or coal. This includes, in lines 1 – 9 of column 3, a helicoid flight conveyor screw that introduces turbulence which provides turbulence which imparts several advantages as discussed in lines 12 - 23 of column 3. COX further teaches in lines 23 - 28 of column 6 that the speed of the shafts of the conveyor can be controlled from a low of 1/2 revolution to a maximum revolution of 2 and a 1/2 revolution.

It would be obvious to one of ordinary skill in the art to rotate the screw that WOLFE at the velocity of 1/2 revolution to a maximum revolution of 2 and a 1/2



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revolution that COX teaches.

The motivation to do so can be found in lines 28 – 32 of column 6 of COX. COX teaches that the speed is controlled so that the char is not fully processed and not overbaked.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention.

7. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over WOLFE (U.S. 5,151,159) in view of TAKEDA (U.S. 6,264,721).

The above discussion of WOLFE is incorporated herein by reference.

WOLFE does not explicitly state that the material may be iron ore or metal oxide and the treatment is making steel or metal in the presence of a reducing agent.

However, TAKEDA teaches in lines 11 - 32 of column 1 that a known method of producing crude steel is the use of iron ore stacked with a reducing agent and heated.

One of ordinary skill in the art would, with a reasonable expectation of success, expect the same result if the iron ore was heated with a reducing agent in the retort chamber that WOLFE teaches.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

8. Claims 1, 2, 3, 9, 11, 12, 13, 16, 21, 28, 33, 34, and 35 rejected under 35 U.S.C. 103(a) as being unpatentable over SMITH (U.S. 1,415,061).

Regarding claim 1, SMITH teaches in lines 25 – 50 of page 1 a furnace retort. The furnace retort has means for insuring and controlling the downward passage of the

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coal through or along the interior of the retort (**housing**), preferably comprises two shafts (**double screw**) each of which has outwardly extending members, and the part of the outwardly extending members which is at the lower end of each shaft is a spiral (**double extrusion screw**) that is relied upon to control the amount of coal passing downwardly through the retort. SMITH teaches in lines 63 - 73 of page 1 that where a pair of shafts is used the shafts are preferably arranged so that the outwardly extending members—on one shaft overlap the outwardly extending members on the companion shaft (**intermeshing**). SMITH teaches in lines 18 - 24 of page 1 that the furnace retort has been designed for partial carbonization of coal. SMITH also teaches in lines 29 – 33 of page 4 the temperature of 850 to 1200 F that the coal is subjected to (**pyrolytical conditions**).

SMITH teaches in lines 29 – 44 of page 4 that each screw turns in the direction indicated by the arrow A in figure 1 (**countercurrent**).

SMITH does not seem to explicitly state that the intermeshing double extrusion screw is defined as an extrusion screw of which two approximately parallel screw have blades such that the thickness of a blade is at least equal the distance between two neighboring blades.

However, SMITH does provide in figure 1 blades on each shafts that have thicknesses that are at least half the distance between the two neighboring blades.

SMITH also does not seem to explicitly state that the two screws fit closely in the housing such that the material undergoing the treatment has to stay between the blades of the screws.

However, once again, SMITH does provide in figure 1 the two shafts fit closely in the housing such that the material undergoing the treatment has to stay between the blades if the shafts.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 2, SMITH teaches in lines 51 – 52 of page 1 that the shafts each have a body portion that are hollow (**extrusion screw has a hollow shaft**).

Regarding claim 3, SMITH does not seem to explicitly state that the blade or blades on the hollow shaft are hollow as well.

However, SMITH teaches in lines 51 – 52 of page 1 that the shafts each have a body portion that are hollow.

It would have been obvious to one of ordinary skill in the art to use blades that were hollow as well.

The motivation to do so can be found in lines 51 – 55 of page 1 of SMITH. SMITH teaches that a hollow shaft would serve the same function without unduly increasing the weight. The same applies for the blades. T

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 9, SMITH teaches in lines 123 – 130 of page 2 and lines 1 - 2 of page 4 that housing has openings which vertically extend to a waste gas duct (**the housing has one or more outlets for gasses formed and/or one or more outlets for products formed**).

Regarding claim 11 and 28, SMITH does not seem to explicitly state that the distance between the shaft of the screw and the housing is at least of the same order as the distance between two successive blades.

However, SMITH does provide in Figure 1 a diagram where the distance between the shaft and the retort shell is in the same order as the distance between the neighboring blades of the two shafts and wherein the distance between the shaft and the housing is larger than the distance between two successive blades. Two successive blades has been interpreted as blades of both shafts.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 12, SMITH teaches a screw in figure 3 and in lines 26 - 38 of page 2 shafts in which the major part of the outwardly extending members on the shafts are in the form of arms or paddles (**internals**)

Regarding claim 13, SMITH teaches in lines 25 – 29 of page 1 that the furnace retort is constructed so as to have a vertically extending tubular inner wall or retort shell. The furnace itself would serve as the outer wall (**double walled**)

Regarding claim 16, SMITH teaches in lines 18 – 24 of page 1 that the furnace retort has been designed to eliminate a part of the volatile hydrocarbon content in the coal (**coal**) and in order to obtain a uniform but partially distilled coal residue.

SMITH does not seem to explicitly state that the uniform but partially distilled coal residue is char.

However, one of ordinary skill in the art would recognize what a byproduct of coal

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in a furnace would be char.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claims 21, 33, and 34, SMITH teaches in lines 29 - 34 of page 4 that the temperature in the retort is approximately 850 to 1200 degrees F. The maximum temperature of 1200 degrees F is about 648 degrees C (**between 300 - 1000 C, 400C to 700C and approximately 600 C**).

9. Claims 5, 6, 7, 8, 10, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over SMITH (U.S. 1,415,061) in view of BAILEY (U.S. 3,178,361)

The above discussion of SMITH is incorporated herein by reference.

SMITH does not seem to explicitly state that the blade of the shat has a variable pitch.

However, BAILEY teaches in lines 48 - 56 of column 1 an apparatus that comprises a housing having proper bearings for two intermeshing screws driven in the same direction and an overlying feedback screw driven in an opposite direction. The invention is taught in lines 9 – 14 of column 1 to be related to carbonization of coal ore more particularly to apparatus for carbonizing coal into char or coke. BAILEY teaches in lines 18 – 28 of column 2 that the pitch can be varied either uniformly or non-uniformly.

It would be obvious to one of ordinary skill in the art to use BAILEY method of varying the pitch of the blades on the shafts that SMITH teaches.

The motivation to do so can be found in lines 22 – 25 of column 2. BAILEY

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teaches that carrying the pitch of the blades allows any desired proportion of the material to be lifted up.

Regarding claims 6, 7, and 27 SMITH does not seem to explicitly state a blade with sections of alternating short pitch and long pitch or a blade having one section having a short pitch and one section having a long pitch.

However, BAILEY teaches in lines 18 – 25 of column 2, screws having a uniformly decreasing pitch from right to left. The screws may be divided in half and the right half of the screw is considered to be a section having a long pitch and the left half of the screw is considered to be a section having a short pitch. The blade would then have an alternating long and short pitch.

It would be obvious to one of ordinary skill in the art to use the blade with the alternating pitch that BAILEY teaches on the shaft that SMITH teaches.

The motivation to do so can be found in lines 15 – 22 of column 2 of BAILEY. BAILEY teaches that a screws with decreaseing pitch would be able to feed back a greater proportion of the advancing material, in the case of certain high volatile coals.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 8, each blade is also broadly interpreted to be a kneading element. Therefore, each pitch would have a kneading element present between the shaft of the extrusion screw and the housing.

Regarding claim 10, SMITH teaches in structure of the retort chamber in figure 1. Its shown that each section of the extrusion screw having a blade with a pitch has an

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outlet for the gases formed. Therefore, each blade with a long pitch would also have an outlet for the gases formed.

### ***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MING CHEUNG PO whose telephone number is (571)270-5552. The examiner can normally be reached on 9:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571)272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ellen M McAvoy/  
Primary Examiner, Art Unit 1797

Ming Cheung Po

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